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DIVISION OF
OIL, GAS & MINING

Certified Mail

(Return-Receipt Requested)

February 25, 1991

Mr. Frank D. Wicks, General Manager
Barrick Mercur Gold Mine
P.O. Box 838
Tooele, UT 84074

Re: January, 1991 Barrick Long-Term Aquifer
Pumping Test Analysis, Dump Leach Area
#3, Well MW-10, and **Notice of Deficiency
and Request for Plan of Action**, G. W.
Permit No. UGW450001.

Dear Mr. Wicks:

We have reviewed the above referenced report, and supplemental submittals of January 30 and February 13, 1991. After careful review and consultation with the U.S. Geological Survey, we have determined that the pump test is inconclusive in achieving the objectives outlined in the December 18, 1990 Conditional Approval, based on the following factors:

1. Hand Versus Transducer Water Level Measurements - from review of the field sheets in Appendix D of the report it is apparent that many discrepancies exist between hand and transducers measurements of water level. In the case of well MW-11 these errors range from a 0.01 foot to 3.02 feet and occur with 78 of 126 readings reported. In the case of MW-13 they range from 0.06 foot to 0.85 foot, and occur with 82 of the 135 readings reported. In addition, discussion with Dames & Moore has indicated that the sensitivity of the transducers is limited to 0.06 feet. Review of the field sheets and the computer printouts for the pump test analysis reveals that all water level values used in the analysis were those from the transducer readings only. It is apparent that the hand measured water levels were not used to correct the transducer readings. Failure to correct the transducer readings can make the interpretation of the pump test inaccurate, if not invalid. This case is particularly sensitive to this problem because the magnitude of the measurement discrepancies are larger than the magnitude of the apparent drawdowns reported from wells MW-11 and MW-13 (see the Conclusions and Recommendations on page 13 and 14 of the report). Consequently, any confidence in the drawdowns measured in the observation wells or in the results of the pump test analysis has been greatly eroded.

2. Seasonal Correction of MW-11 Water Level Data - accepted hydrology practice would include background water level monitoring prior to pumping for a period of time approximately equal to twice the anticipated pumping time; in this case for approximately 18 consecutive days. Review of water level measurements made in well MW-11 from June 27, 1990 thru February 7, 1991 show a continuous linear decline in water level of approximately -0.09 ft/day. However, in the pump test analysis submitted a seasonal rate of decline of -0.064 ft/day was used, as derived from 3.95 days of pre-test monitoring. We believe that the longer-term rate of -0.09 ft/day should have been used to correct for seasonal trend in MW-11. Use of the longer term seasonal correction rate may significantly alter the results of the pump test analysis.
3. Seasonal Water Level Trend Reversal in Well MW-13 - reversal of the declining water level trend in well MW-13 to a rising water level trend at the beginning of the pump test significantly adds to the uncertainty of the actual seasonal trend and any background, drawdown, or recovery data corrected for seasonal trends. Additional water level monitoring must be completed before the water level data in the report can be corrected for seasonal trends. If post-test trends do not match the pre-test trends already observed, the pump test may need to be repeated during a period of stable rate of water level change. As a side note however, it is interesting to note that from November 16, 1990 to January 7, 1991, the average water level decline in MW-13 was approximately equal to the decline experienced in MW-11 (-0.09 ft/day).
4. Drawdowns and Recovery Drawdown Values Based on Uncorrected Data - accepted hydrologic practice is to quantify drawdowns and recovery drawdowns in a well only after having corrected the water level data for interference from seasonal trends and barometric effects. We agree with your conclusion that the wells do not appear to be effected by barometric pressure changes. However, upon close review we have determined that both the drawdown and the recovery drawdown data reported from MW-11 and MW-13 are founded on uncorrected data. All references in the report to changes in rates of water level decline or rise in wells MW-11 and MW-13 have also been based on uncorrected data, compare pages 10 through 12 with the conclusions reached on pages 13 and 14. This breach of accepted hydrologic practice invalidates conclusions numbers three and five on pages 13 and 14 of the report.
5. Failure to Measure Transmissivity and Storage Coefficient in Observation Wells - the purpose of a multiple well pump test, one with a pumping well and nearby observation wells, is to determine both transmissivity and storage coefficient of the aquifer by use of data from all the wells involved in the test. In fact, storage coefficient can only be determined through data collected from the observation wells. A multiple well pumping test was also required by the Conditional Approval in order to determine more representative input values of transmissivity and storage coefficient for the subsequent

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ground water flow model, see Condition 5. Failure to use observation well data to reinforce the pumping well data and failure to determine storage coefficient from the observation wells frustrates the original purpose of the pump test and reduces the possibility of a unique solution for the ground water flow and advective dispersion model. Barrick must measure these aquifer parameters through use of data from observation wells in order to comply with Conditions numbers 2 and 5 of the Conditional Approval.

6. Predicted Arrival of Pumping Influence at MW-11 - in addition to the dispute over the validity of the reported drawdown, the evidence based on the arrival time of the cone of depression at MW-11 and MW-13 is weak, in that the Theis analytical solution used for this justification relies on an assumed storage coefficient, and consequently does not represent a unique solution. This invalidates conclusion number four on page 13 of the report.
7. Analysis of the Pumping Well Data - analysis by the Cooper and Jacob method assumes a constant pumping rate, see Figure D-3. Review of the pumping records in Appendix D indicates the rate was not constant for the entire duration of the test. Consequently, this method should not be used for analysis of the MW-10 pump test. In addition, the type curve used in the Jacob and Lohman method (see Figure D-2) is so flat that the match point could be located in more than one place, resulting in a range of possible transmissivity solutions. Consequently, use of this method should define the range of values possible, or Barrick may opt to use Jacob and Lohman's straight-line method to determine transmissivity and storage coefficient.

Because the pump test was inconclusive, we are unable to determine if the existing monitoring wells are hydraulically interconnected, nor will Barrick be able to estimate the hydraulic conductivity ellipsoid, as required by Condition 2 of the Conditional Approval. As outlined in Condition 5, the hydraulic properties of the aquifer, including transmissivity and storage coefficient, are prerequisite to the ground water flow and advective dispersion modeling; consequently Barrick will be unable to complete the modeling with any degree of confidence.

This letter therefore constitutes a formal Notice of Deficiency of the December 18, 1990 Conditional Approval. We request that Barrick immediately submit a plan of action to achieve compliance with the pump test requirements and all other conditions of the Conditional Approval by the June 15, 1991 deadline. We agree with your consultant's recommendation that additional pump testing of well MW-10 will not likely produce improved results in wells MW-11 and MW-13. Consequently, we recommend that Barrick consider installing additional monitoring wells in closer proximity to the pumping well MW-10 and repeat the pumping test to measure the pertinent aquifer parameters listed above. However, we are willing to consider other alternatives that you may propose that will achieve the same ground water monitoring objectives and effectiveness required by the Conditional Approval and the permit, Part I E 2. Because the

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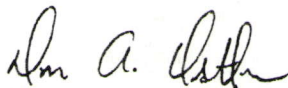
ground water flow and advective dispersion modeling is dependent on satisfactory results from the pump test, the above issues must be resolved before model results can be reviewed by the Executive Secretary.

Please be advised that failure to satisfy all the conditions of the Conditional Approval and to provide an adequate compliance monitoring well system in compliance with Part I E 2 of the permit by June 15, 1991 will constitute a failure to monitor and will result in a violation of both the Conditional Approval and the permit. Pursuant to Part III of the permit, violations of the permit or the Conditional Approval issued thereunder, constitute grounds for enforcement action which can include permit termination, revocation and reissuance, modification, denial of permit renewal, and/or civil penalty.

We request a meeting with your staff and consultant to discuss these issues and your proposed plan of action in detail. Please contact Loren Morton to arrange such a meeting or to answer any questions or comments.

Sincerely,

Utah Water Pollution Control Committee



Don A. Ostler, P.E.

Executive Secretary

LBM:lm

cc: Geoff Freethey, USGS-WRD, SLC
Grant Bagley, Asst. Attorney General
David Bird, Parsons, Behle & Latimer
Stephen Matern, Tooele County Health Dept.
Wayne Hedberg, DOGM
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